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Decomposition of HeterogeneousClassification Problems

12800017 [A1], 12800017 [A1], Se June Hong [A1], Jonathan R. M. Hosking [A1], Jorge Lepre [A1], Edwin P. D. Pednault [A1], Barry K. Rosen [A1]

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Abstract:

In some classification problems the feature space is heterogeneousin that the best features on which to base the classificationare different in different parts of the feature space.In some other problems the classes can be divided into subsetssuch that distinguishing one subset of classes from anotherand classifying examples within such subsetsrequire very different decision rules, involving different sets of features.In such heterogeneous problems, many modeling techniques(including decision trees, rules, and neural networks)evaluate the performance of alternative decision rulesby averaging over the entire problem space, and are prone to generating amodel that is suboptimal in any of the regions or subproblems.Better overall models can be obtained by splitting the problemappropriately and modeling each subproblem separately.

This paper presents a new measure to determine the degree of dissimilaritybetween the decision surfaces of two given problems, and suggests a way tosearch for a strategic splitting of the feature space that identifiesregions with different characteristics.We illustrate the concept using a multiplexor problem.

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Eric Bauer, Daphne Koller, Yoram Singer
Proceedings of the 13th Annual Conference on Uncertainty in AI (UAI)

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Abstract: This paper re-examines the problem of parameter estimation in Bayesian networks with missing values and hidden variables from the perspective of recent work in on-line learning [12]. We provide a unified framework for parameter estimation that encompasses both on-line learning, where the model is continuously adapted to new data cases as they arrive, and the more traditional batch learning, where a pre-accumulated set of samples is used in a one-time model selection process. In the batch case,... (Update)

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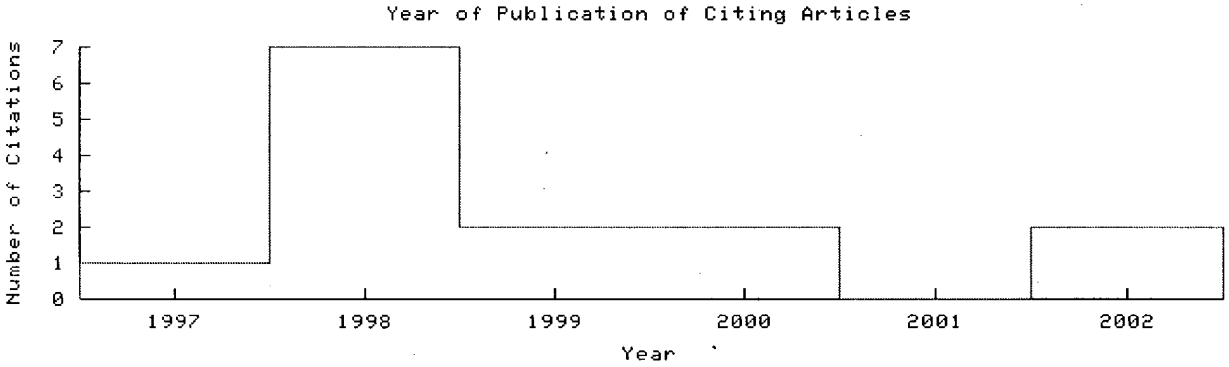

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J. R. Quinlan Basser Department of Computer Science University of Sydney...

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Context of citations to this paper: More

...rules, Missing Values, Preprocessing, Decision Trees. **1 Introduction The missing values problem is an old one for analysis tasks[9] [12].** The waste of data which can result from casewise deletion of missing values, obliges to propose alternatives approaches. A current one is to...

...as that of the defining boolean function. **There has been some empirical work studying the task of learning from incomplete data [8, 35, 15].** With the goal of giving a theoretical explanation for the observed empirical phenomena, Schuurmans and Greiner [38, 39] studied the...

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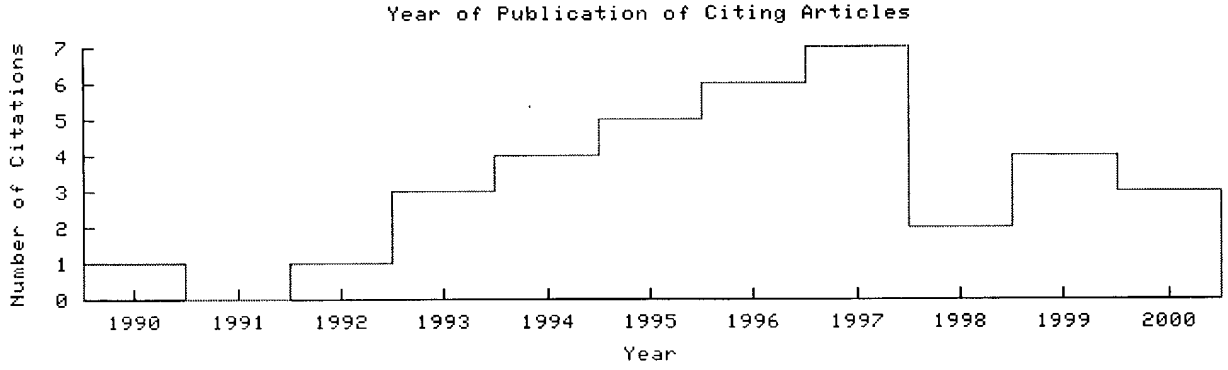

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